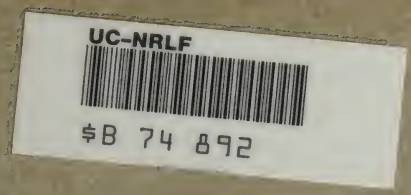


AN ADDRESS

AT THE

DEDICATION OF PARDEE HALL,

LAFAYETTE COLLEGE,

OCTOBER 21, 1873,

BY

ROSSITER W. RAYMOND, PH. D.,

LECTURER UPON MINING ENGINEERING IN LAFAYETTE COLLEGE, PRESIDENT OF THE AMERICAN INSTITUTE OF MINING ENGINEERS AND UNITED STATES COMMISSIONER OF MINING STATISTICS.

WITH AN APPENDIX

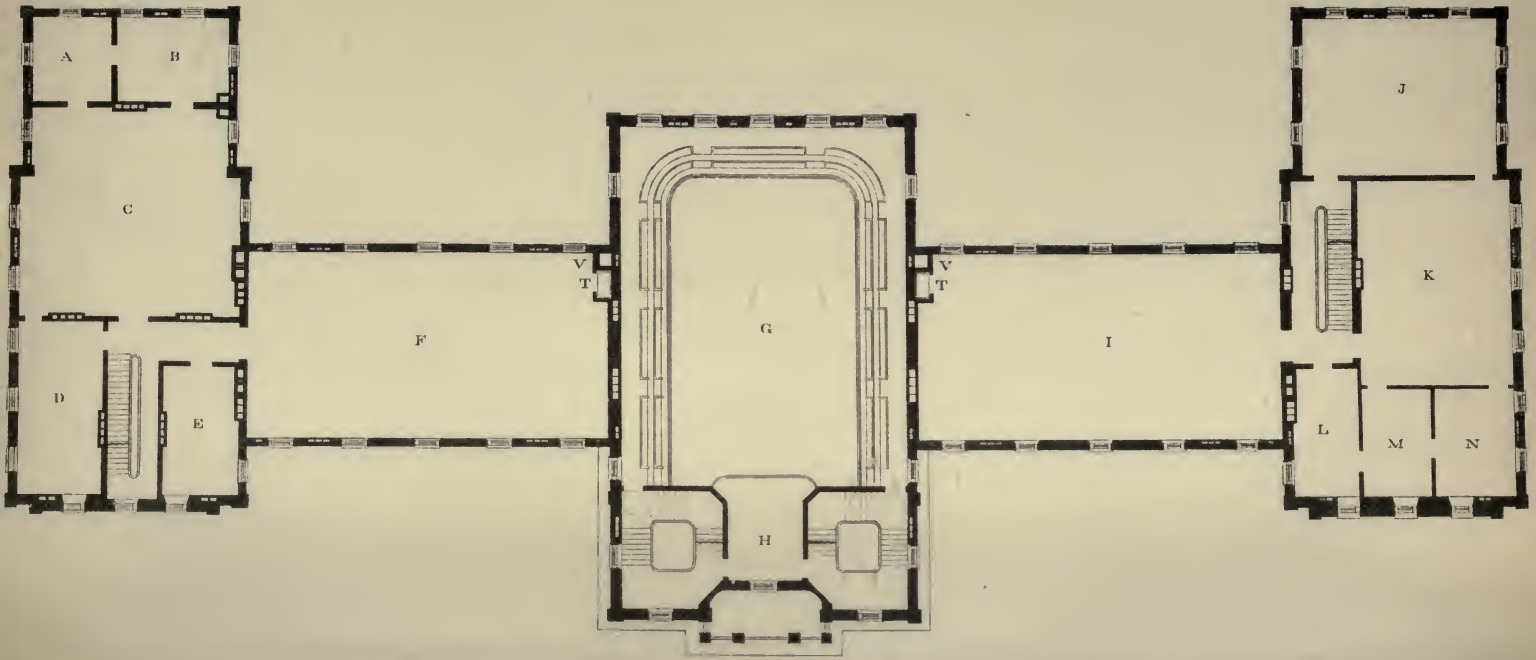
CONTAINING A REPORT OF OTHER ADDRESSES AND THE GENERAL PROCEEDINGS OF THE DAY.

PRINTED BY ORDER OF THE BOARD.

EASTON, PA.

1873.

FOURTH FLOOR



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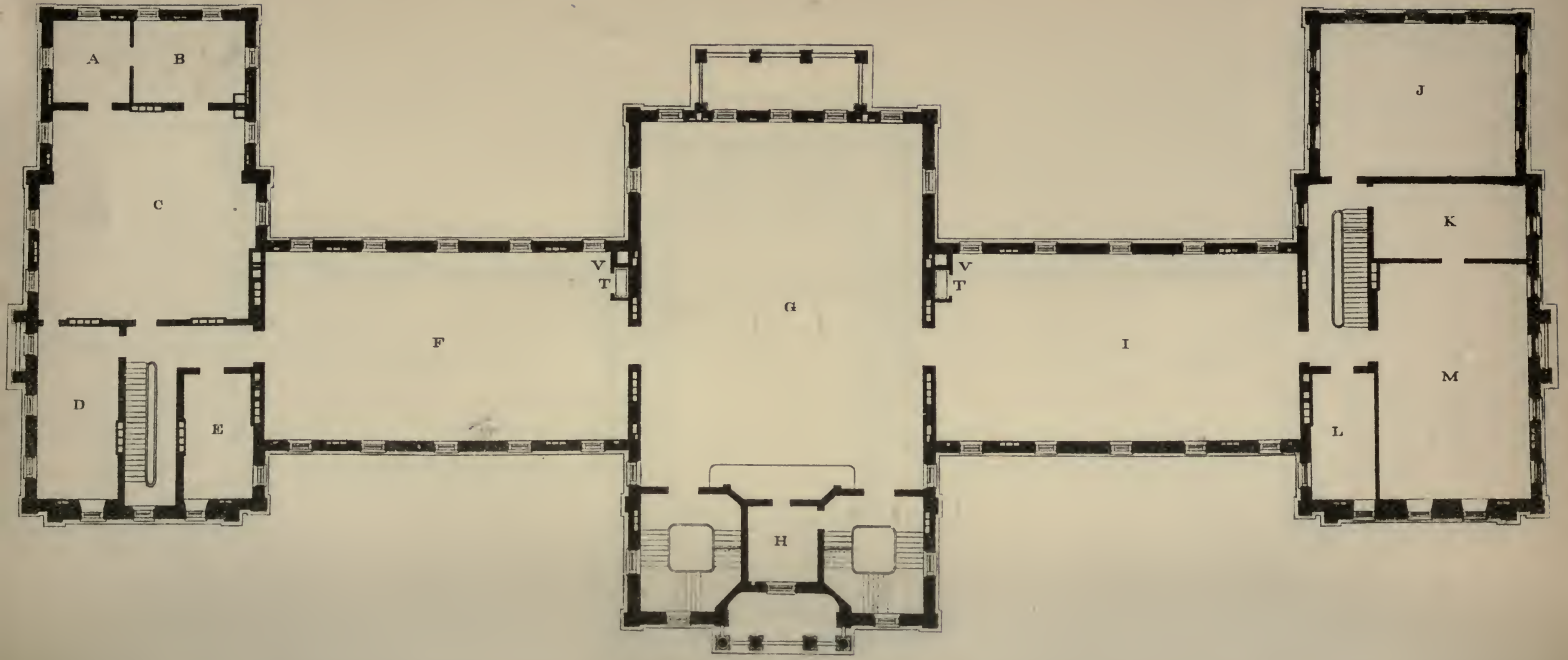

SECOND FLOOR

FIRST FLOOR

PARDEE HALL.

AN ADDRESS

AT THE

DEDICATION OF PARDEE HALL,

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ADDRESS

OF

R. W. RAYMOND, PH. D.,

LECTURER ON MINING ENGINEERING IN LAFAYETTE COLLEGE, PRESIDENT OF THE AMERICAN INSTITUTE OF MINING ENGINEERS AND UNITED STATES COMMISSIONER OF MINING STATISTICS.

Mr. President, Brethren of the Faculty of Lafayette College, Ladies and Gentlemen: The precise position of the orator on this occasion is not perfectly clear. We are gathered in this edifice, beautiful with all the adornments of art and with the higher beauty of adaptation to the ends for which it is constructed—a palace, the possession of which might make any man proud and which will presently be transferred, we all being witnesses, to the formal charge of those intrusted with its administration in the interest of the great cause that inspired its erection. Until that transfer shall have been made, I suppose we are in some sense the guests of Mr. Ario Pardee, and perhaps it is a part of my duty to speak for him in bidding you welcome on this occasion. But this were unnecessary. The jubilant city below you, these open doors before you, the cordial faces around you, and, most of all, the presence of the generous host himself, have long since bid you heartily welcome. Between him and you no mere interpreter is called to stand. How can words speak for him whose deeds are the best eloquence of this hour? Nor is it necessary that I should speak for you, yet I cannot but attempt a feeble expression of the sentiment which I know is uppermost in all your minds. When a multitude is filled with one common feeling, the single voice that utters but an echo of it is not unworthy to be heard.

And when that feeling is the spontaneous admiration of a generous act, the listener may discern in the tones of the humblest speaker, not *vox et preterea nihil*, but *vox populi* and *vox Dei*, the applause of mankind and the approbation of Heaven. Servile flattery would be out of place at this time, but to be silent for fear of offending the modesty of Mr. Pardee would be to surrender the right and betray the duty of praising "a good deed in a naughty world." The unselfish liberality of his endowments of education here deserves our hearty recognition. Yet I more admire their wisdom. None but the unselfish can be really wise in benefaction. It would have been easy, with the money that has been concentrated here, to win the reputation of munificence throughout the land. Innumerable subscription lists might have been enriched, countless paragraphs in the newspapers might have sounded the name of the professional philanthropist, whose purse was never closed. I would not disparage any form of generosity, but I do not hesitate to say that the highest use to which wealth can be put is not found in indolent yielding to the calls of charity. The steward of worldly property is bound to administer it with forethought and wisdom, to study earnestly the objects to be gained, and to seek the best means in his charity as in his business. On behalf of the Christian citizens of the United States—a nation whose national virtue, and vice, is giving—I wish to thank Mr. Pardee for a new example of giving wisely—giving thought as well as money. As the poet says, "he gives himself with his gift."

Americans are sometimes accused by foreign critics of an excessive love of making money. There is truth in the statement, but not in the blame conveyed. In the first place our people work harder, because their wants are more numerous than those of other nations. They read more books, they buy more pianos, they travel more, they try more earnestly (if not always with the best success) to satisfy the sense of beauty in the household, and all these things cost money. But when the limit has been reached at which all desired facilities and comforts of life can be secured, our people still continue to work and to make money. Yet they do not accumulate like misers; they rejoice in activity, they do not gloat over gold. It is not avarice, but the joy of conscious power that moves them.

Nothing, indeed, is sadder than the sight of such activity, pivoted wholly upon selfishness, outraging the feelings of the good or the rights of the weak. But nothing is more beautiful than the spectacle of wealth wielded with the strong hand and generous heart, of skill and sagacity brought to bear upon the question, how to benefit society. Such wealth breeds no danger to the community, and ought never to rouse the faintest sigh of envy. Every poor man in Pennsylvania has reason to be glad and give thanks to-day that Ario Pardee is rich.

I said that I would not speak for him, but in that which I am now about to say I am sure he would wish to join. Our tribute to Mr. Pardee himself would be incomplete if it did not make mention of one whom he has so highly esteemed and trusted and whom we all admire and love—the man to whom Lafayette College owes it to-day that she is able and worthy to accept this new and magnificent trust—I mean her honored president. Those who remember the condition of the college less than a decade ago and who look upon its condition and prospects now are able to measure, perhaps, the wonderful work that he has done; but who can measure the energy, the tact, the single-minded devotion, that went to the doing of it? The successive endowments, amounting now to nearly a million dollars, which have poured in during that period, have been so many testimonies of faith in the man at the helm of the enterprise. But all these tokens of outward success would be vain without the witness of the interior prosperity of the college itself; its harmonious activity; its high standard of scholarship; its steady and conservative progress; its cordial recognition of the demands of the age, and its firm retention of that which was best in the ancient curriculum and discipline. I believe that I speak the unanimous feeling of the faculty of the scientific department when I say that we regard President Cattell as a wise and prudent director, a sympathetic and judicious critic, a dear friend and the centre and power of our department, as of every other in the college.

As I look upon this scene, so significant of the new era in human thought and labor upon which we are entering, my mind turns to another scene gazed upon not long ago and never to be forgotten. Perhaps the subject which has filled the minds

of the largest number of civilized men, for the longest time, during the year which is now drawing to a close is the Exposition at Vienna. Nothing could well be more unjustifiable than the statement that has been made in certain quarters that this Exposition was a failure. There are but two circumstances which could serve, even indirectly, as a basis for such an opinion. The first is the circumstance that the management of this Exposition on the part of the commission representing the Austrian government has incurred for that government the loss of many millions by the magnificence and costliness of its appointments. It is said that, apart from the original outlay involved, the daily expenses of the Exposition have been greater than its current receipts. But this, however it may be regarded from the standpoint of the party called upon to pay the bills, is certainly no case for complaint from the lips of those who, as visitors, have enjoyed for so much less than their due proportion of its cost the benefits of this extraordinary display. The second ground for the allegation of failure is the defectiveness of the system of arrangements, or rather the failure to adhere to any system in arrangement presented by the Exposition. This defect rendered it extremely difficult, if not totally impossible, to study satisfactorily either the products of any one nation as such or the natural exhibition of any one product as such. But this lamentable blemish was intimately connected with the extent and magnificence of the Exposition as a whole; with its extent, because it was the overwhelming abundance of objects exhibited which overflowed the limits assigned in the original plan to nations and to groups; with its magnificence, because the presence in great numbers of individual installations for private and separate exhibitions, though one of the most troublesome elements in the way of the serious student in any special department, nevertheless, to the eye of the casual visitor, added greatly to the beauty and splendor of the scene.

The truth of criticisms on these points being granted, there remains little to be urged against the statement that the Vienna Exposition far surpassed its predecessors as an epitome of the present condition of the world, with respect not only to the mechanic arts, but in the whole range of elements which go to make up modern civilization. More than any previous enter-

prises of its kind, it was a World's Exposition. This cosmopolitan character was due partly to the position of Vienna itself, situated as it is almost on the edge of Asia, partly to the extraordinary and not yet fully comprehended awakening of the Orient peoples within the last decade to the new life of modern progress. Both significant and amazing were the evidences of intellectual and industrial activity presented at this Exposition from regions which have for centuries scarcely contributed anything to the common stock of mankind in any department of science or art. The enormous material progress of the Austrian empire was so magnificently illustrated in the endless spaces devoted to that country within the walls of the Exposition, that we may fairly believe that Austria, in the effect produced upon other nations and upon the consciousness of her own citizens, will gain from this undertaking a benefit more than sufficient to counterbalance her financial loss. The remarkable exhibitions of Turkish, Persian, Indian, Chinese, Japanese and Egyptian industries, and the still more remarkable fact that all these remote regions should be roused to participate actively in such an exposition at all, opened a vista of the coming brotherhood and consolidated progress of the nations which never before in such glory and completeness had dawned upon the world. The Exposition was, in truth, a microcosm of the civilized world. To walk through its interminable aisles, its seven immense principal buildings, crowded with the achievements of human intelligence and perseverance in every clime, to visit the 200 outside buildings, palaces, peasant-houses, cafés, bazars, pavilions, historical exhibitions, scattered through the grounds, was like compressing into a few days the experiences of a lifetime of travel over the whole earth.

One of the most profound lessons taught by this Exposition is the great truth that human knowledge has grown far too wide and multiform to be compassed any longer by individuals, and particularly that the conventional culture of former generations fails to give even a key for the comprehension of this. In the face of this bewildering display of multiplied arts, the inadequacy of what used to be considered a liberal education was painfully apparent. One who wore the scholastic title of "Master of Arts" could not but blush to find himself in their presence,

and not only not their master, but almost absolutely ignorant of them all.

A second lesson, not less important and timely, is the conviction produced by such an ocular demonstration that entire ignorance of the world in which we live, and of the activity which characterizes the present age, will no longer be tolerable to cultivated men. While the scholar, confining himself to the narrow range of conventional studies, could live his quiet life untroubled by the thought of the vast realms and interests with which he had no concern, it was possible for men to maintain an artificial standard of learning and accomplishments. The time is not far past when a little familiarity with classic literature, pure mathematics, speculative philosophy, and rhetoric would entitle him to be considered an educated man, who was ignorant of living languages, of the geography and politics of foreign countries, of the physical sciences, and of the gigantic enterprises of human progress which are based upon them. But that time is already gone by; it is no longer wise or Christian, and soon it will be no longer fashionable to wrap one's self in the narrow garments of an outworn scholastic culture, and to ignore the vital problems and movements of the times. This brings us to the question of the new era in education corresponding to the new era in human liberty and human thought; the era of universal interchange and universal progress among the nations; the era of the application of scientific discovery to the welfare of humanity; the era of the triumph of mind over matter.

What then is education? No doubt in the widest sense it is the development and training of the faculties of man which, beginning at the cradle, ends only at the grave, and comprises not merely all that parents and teachers can impart, but the far greater influence of every circumstance of life.

It is, indeed, fortunate that such is the case. Sad would be the fate of many a man if the mistaken and incomplete preparation which he received in school were all that he had to rely upon in the struggles and labors of life. In many, if not in most cases, the training of the school does little more than to awaken and to direct, perchance to misdirect, those faculties which must afterward become sharpened and hardened by the attrition of contact with practical affairs. Nevertheless, the importance of

wisely administering that part of the education of a man which we call education in a narrow sense, cannot be over-estimated; and it is well to inquire what are its true objects and methods; whether it does or does not need to be modified to suit the changing conditions, social and political, of the human race.

It is not my intention to enter upon a thorough discussion of this profound subject. I can claim no such authority as would entitle me to attention, if I were rash enough to undertake this task. But one or two general observations, intended rather to formulate that which all parties believe than to advance propositions likely to arouse controversy, may not be out of place at this time.

What is practically the object of education in its limited sense? What is our object in sending our boys to school? I think we may all unite in one reply. It is to do what lies in our power to insure their success in life. I say we may all unite in this reply, since the terms employed are so vague as to permit each one of us to put upon them his own construction. Our ideal of success in life may range from the mere acquisition of money or fame to the highest conception of usefulness and benefaction. The means need not greatly differ, whether the motives be selfish or generous and lofty. So far as the physical and intellectual training of the student is concerned, those means which would make him strongest for his own aggrandizement would make him strongest also for the good of his neighbor and the world. Power is power; knowledge and skill are power, whether they are employed by noble or by mean and selfish motives.

The great antithesis of the age, illustrated not only by the Vienna Exposition of which I have spoken, but by all the social phenomena that surrounds us, consists in a tendency on the one hand to organization and combination, and on the other hand to the development and protection of individual rights and character. Great corporations and great nations are moving through contemporaneous history with a momentum never realized before in any age, yet at the same time there never was an age when the individual man more highly prized and more successfully defended, or more universally developed and applied, his individual rights and faculties. The dream of some philosophers, of a social organization in which the division of labor should be

carried to an extreme, and every man should do only that which he could do best, so that communities of men should become the units of the race of the future, contradicted not only the wisdom of the past, but the unconquerable instincts and unerring prophecies of the present. Side by side with the principle of the unity of the race in its interests, its progress, and its destiny —that principle which is the central social force of Christianity— stands another, without which the first would be worthless and barren, that of the dignity, liberty, and responsibility of the individual man; and however much these principles in their social and political outworkings may seem to contradict one another, the practical experience of the race has shown that they cannot be separated, that man cannot reach his full individual development without the recognition of the brotherhood of all, and, on the other hand, that there can be no true progress of mankind except by the elevation and education of individual men. As, according to the poet, it is the citizens that constitute the state, so we may now say in a larger view it is the full-grown, free, intelligent, and virtuous man that constitutes the life, power, and hope of the race.

In the quaint and stately old cathedral of Antwerp, behind the high altar, is a picture before which I stood, not many days ago, with a special interest—an Ascension of the Virgin, by Quentin Matseys, the Blacksmith. You remember his romantic story, how he became an artist for love of a painter's daughter, and how, after years of laborious endeavor, he returned to his native town to conquer, by his triumphant art, both fame and happiness. The genius cannot have been wanting in him from the beginning, but it might have slumbered always had it not been called to life by the clarion voices of love and necessity.

In the transept of the same cathedral hangs the masterpiece of the prolific, exuberant pencil of Rubens—the Descent from the Cross. This great artist followed his own irresistible impulse; he flooded the world with pictures, laid all history and mythology under contribution to his easel, rose while yet living to a lofty eminence in the opinion of men, of which he cannot be said to be deprived by death and time. In comparison with the masterly completeness in spirit, design, and detail, in drawing and color, in light and shade, of his immortal picture, the

canvas of the blacksmith presents but a vision of meritorious mediocrity; and, gazing upon the two, one is compelled to admit that painters are born, not made.

That which is true of painters may be maintained as well of every handicraft and occupation. If the acquirement of the highest excellence in special directions is the object sought, then, one might say, nothing can be better as a means than encouragement and training of special tendencies. Let him pursue a given study who finds it pleasant and easy; let him who does not find it so, avoid it. "Follow your bent" may be, on this supposition, the best advice to every young beginner; education may consist mainly in the development of the strong faculties and the neglect of the weaker; society may be, in its normal state, an aggregation of specialists, presenting in its extremest form the principle of the division of labor as the best life of the human race.

But this is not the case. Even the object sought, of special excellence in separate lines, cannot be best attained by such a system. The processes and products and rewards of each pursuit are so bound up with those of all the world that the isolated worker stands in great risk of failure.

Nor is the production of specialists the chief end of education. These are the very characters we do not need to educate. They will produce themselves, when the inner impulse is strong enough to make them fruitful and useful.

What is, then, the end of educational systems? Primarily to draw out (as the word implies), to develop, to stimulate, and train the dormant faculties; to produce many-sided—as nearly as possible full-orbed and rounded men. Life and labor will soon enough beat them into special forms. There is no danger that our little schooling, of a few hours per week for a few years, will roll all minds to profitless uniformity. The peril is on the other side altogether; and it is for us to labor to prevent, particularly under the circumstances of American society, the rise of a generation of narrow specialists.

There is danger that in our new-born zeal for scientific education we may sacrifice the interests of a truly liberal culture, producing, as I have said, a generation of specialists, incapable of appreciating the departments of human thought which lie out-

side their own, or even of rising within their own departments to broad and comprehensive views. We must not use the microscope till we spoil the eyes. We must not overstrain the investigator until he becomes less than a full man. The chemists, geologists, engineers, must not cease to be intelligent and active citizens. It may be demonstrated that such a mistaken neglect of studies outside the range of a chosen profession, cripples activity and impairs success even in that profession. It is one result of the brotherhood of knowledge that no man, whether employed in the original investigation of nature or in the application of natural laws to practical ends, can advance successfully without perpetual communication of his thoughts to others, and the reception of their suggestions and experiences in return. Hence the mastery of language, which was the first condition of civilization, remains the essential condition of progress. The power to comprehend statements, logical arguments and demonstrations, and to make such statements as may be comprehended by others, and will carry weight and influence in the very perfection of their form, is a vitally important part of the preparation of every young man for his life's career. His success, aside from its moral qualities, will be in direct proportion to his influence over other men; and this influence, again, will be in part proportional to his command of the means by which the minds of men are moved—namely, language. Under this term we may include a knowledge of the methods of practical reasoning, and if this knowledge is best obtained by scholastic study of logic, then logic must be studied. If Latin and Greek are necessary, then they must be studied. For us, one thing is certainly necessary—a thorough mastery of the English tongue; and this alone has been made to yield, in Lafayette College, a mental discipline not inferior to that of the classics.

But influence is not due to language alone. Behind this vehicle of thought there must be fullness and variety of thought itself. Those fruitful analogies, felicitous illustrations, graceful associations, which come, and come alone, though wide acquaintance with human life and literature are so many elements of power; and without this broad basis of a common ground from which to move the minds of others, the student of a special sci-

ence, though possessed of the lever of Archimedes that would move the world, has no place whereon to stand.

In accordance with these principles, the object of the system of college education in America has always been—development and discipline of character and the broad preparation of the student for his subsequent special or professional pursuits. Our colleges may not have succeeded in realizing this ideal, nevertheless this has been their ideal; and it is the right one, as much to-day as ever. Whatever changes are required in our institutions of learning, to adapt them to the necessities of the modern era, must be changes in accordance with this principle—changes of means, not of ends, so far as colleges are concerned.

That changes are required is admitted on all hands. It is admitted that the physical sciences should be introduced to primary and preparatory schools; that they should be taught for the double purpose of mental discipline and of mental acquirement in the class-rooms of our colleges; that in teaching them the scientific, inductive, experimental, instead of the dogmatic, method should be pursued; and, finally, that either connected with our colleges or standing outside of them, schools of thorough scientific and technical special training are imperatively required. It is to inaugurate the wider activity* of such a school that we are met here to-day, and I shall say a few words concerning the relation of this school to Lafayette College on the one hand, and to technical education and the needs of the present time in technical departments on the other hand.

It must be considered a benefit, both to the college and to the school, that they belong together. So important an element as that which is represented by the scientific department must have

* The scientific school of Lafayette College "was organized in 1866, to carry into effect the conditions of a donation from A. Pardee, Esq., of Hazleton, Pennsylvania. In July, 1867, in response to the growing wants of the department, the original donation was increased to $200,000, on condition that other friends of the College should add the same sum to its general endowment. The donations for that purpose, completing nearly half a million of dollars lately added to the College funds, were made before January 1, 1869. In 1871 Mr. Pardee made another donation of $200,000, for the erection of a building designed for the Departments of Engineering, Metallurgy, and Chemistry."—*From the College Catalogue of* 1872–3.

Mr. Pardee has also furnished the entire scientific equipment of the building at an additional cost of more than fifty thousand dollars.

a beneficial effect on the atmosphere and the curriculum of the college, while, in turn, the learning and the culture of the college will shed its benefits upon the special course of the school. It is, indeed, eminently desirable, so far as it is practicable, that the young student should pursue a special course in addition to, and not instead of, a general course. And here let me allude to one of the greatest difficulties in the way of the American education—I mean the haste manifested by parents and guardians to get through with the education of those whom they have in charge. We are often told how absurd it is to attempt in this age of multiplied knowledge to educate young men with the *means* which were considered adequate half a century ago; but we are not so often told of the absurdity of attempting to prepare young men for active and successful careers in the *time* that was considered adequate fifty years ago. The enormously increased demands of modern life, requiring as they do that a man shall know more things, and know how to do more things, than were formerly sufficient for his reasonable success, are not to be satisfied by a mere change in a few subjects of instruction. It is not enough to substitute one study for another. The period of study must also be prolonged. In recognition of this principle, while it is for the present impracticable to make it an invariable part of a college education, by imperatively increasing the length of the college course, or by raising the standard of admission to colleges, the device of a post-graduate course has been very generally adopted; and it will not be long before experience will demonstrate that those men who have received the most thorough preparatory training are able to overtake and to outstrip in the subsequent race of life those who started with half-developed powers and half furnished minds.

On the other hand, it is the business and duty of the educator not only to furnish systematic preparation to those who have the ability to control their own plans or to wisely commence at the beginning and continue to the end, but also to assist those less fortunate ones who, forced prematurely to assume the responsibility of self-support, are nevertheless desirous of obtaining such benefit as they can from books and teachers. If it is true that a little knowledge is a dangerous thing, it is also true that half a loaf is better than no bread. A partial education is

better than none; yet this choice should never be made save under the pressure of necessity. The scientific department of Lafayette College will not refuse its benefits to those who desire to follow a special course, while at the same time it will be administered with full recognition of the greater value of a complete symmetrical system of college training.

While we trust that in time to come scientific investigation will be promoted in no mean degree by this school and its graduates, it must be confessed that at the present time its object is chiefly the preparation of young men for practical pursuits involving the applications of science. Nor can it be fairly said that this department is inferior in dignity to the pursuit of abstract science, so called. It is out of the ranks of the practical workers that those peculiarly gifted in scientific investigation are likely to arise; and it is in the ranks of practical workers that they must look, chiefly, for appreciation and support. It is no derogation from the value of a discovery of truth, to say that it can be made useful to man; and, hence, there is no inferiority in the position of those who make it useful to man.

Indeed, that which the whole world chiefly needs to-day, and our country not less than any other, is the application of scientific truths and principles already known to the affairs and labors and problems of daily life. We might even afford to pause in our career of fresh discoveries, to consolidate the progress and utilize the results already obtained. But the alternative is not presented; it is not necessary or best that any part of the intellectual activity of the age should pause; the advance of science itself assists, and is assisted by, the applications of science. For the sake of science, because for the sake of man, we need a scientific in the place of a barbarous or scholastic architecture; a scientific in the place of a traditional agriculture; a scientific in the place of an empirical engineering. We need more machinery, more economical applications of power, more effective processes of metallurgy and manufacture, more exact knowledge in all these particulars of our own condition and necessities, and of the degree in which these can be supplied by experience already attained abroad.

Lesoinne, a distinguished French writer, defines metallurgy as "the art of making money in the treatment of metals." This

definition may be applied to almost all occupations of life. The practical art of each is not only to achieve certain results, but to do so profitably, to make money in doing so; that is to say, to increase the value of the raw materials, whether wood, or cotton, or ores, or time, or ideas, by the use we make of them, and the transformation to which we submit them, so as thereby to really elevate the condition of humanity—to leave the world better than we found it. This is, in its last analysis, the meaning of honestly making money. Men are put into this world with limited powers and with limited time to provide for their own sustenance and comfort, and to improve their condition. A certain portion of these powers and this time is required for the support of life in a greater or less degree of comfort, and with more or less multiplied means and avenues of enjoyment, activity, and influence. Whatever their labor produces more than this, is represented by wealth, and for purposes of exchange by money. To make money honestly, is to do something for other men better or cheaper than they can do it for themselves; to save time and labor for them—in a word, to elevate their condition. It is in this sense, greatly as we Americans are supposed to be devoted to making money, that we need to learn how to make more money; how to make our labor more fruitful; how to assail more successfully with our few hands the natural obstacles and the natural resources of a mighty continent; how to build up on the area of that continent a prosperous nation united in varied, fruitful, and harmonious industries, glowing with patriotism and inspired by religion.

In this work we need specially the basis of a more thorough technical institution, applying principles of science to the material and economical problems involved. This education is necessary to supply the directing forces for the great agricultural, manufacturing, and engineering improvements of the country. It is also needed as a solvent and remedy for the antagonism between labor and capital. The true protection of labor will be found in its higher education, and in opening to the individual laborer for himself and for his children, by means of that education, a prospect of indefinite improvement and advancement.

But we do not flatter ourselves that the operation of a school will be sufficient, by any magic that there is in books or

teachers, to produce full-grown, well-trained, wise and ready experts. Going to school is but opening the door; leaving the school is but crossing the threshold. What we wish is to open the door right, to open the right door, and to start the beginner in the right direction. It would be easy to show two great correlative propositions to be true; first that scientific instruction is not and cannot be a substitute for necessary practice; secondly that practice alone cannot be a perfect substitute for theoretic knowledge—for that acquaintance with principles involved in any occupation, with their mutual relations, their comparative importance, which enables the workman under new sets of circumstances to perpetually reconstruct his art out of his science.

We have instances enough of learned students of finance who could not be trusted to manage a bank, and, on the other hand, the recent history of our country sufficiently demonstrates that many experienced bankers are too ignorant of the principles of finance to foresee approaching danger, to remedy present troubles, or even to know what is desirable for the future, let alone what would be the proper means of reaching such desirable results. Political economists are not necessarily practical statesmen, yet it is ardently to be desired that practical statesmen were more frequently political economists.

In the realm of metallurgical and engineering operations the difference between theoretical and practical training is, perhaps, still more striking. The student of chemistry in the laboratory cannot be made acquainted with many of the conditions which obtain in chemical and metallurgical operations upon a larger scale. All the chemists of the world failed to comprehend or to describe correctly the apparently simple reactions involved in the manufacture of pig iron, until by the genius and enterprise of such men as Bell, Sunner and Akerman, the blast-furnace itself, in the conditions of actual practice, was penetrated and minutely studied. Moreover, in all the experimental inquiries of the laboratory the question of economy plays no part. It is the art of separating and combining substances which the student follows there, not the art of making money. That education of judgment and decision, of choice of means for ends, which the exigences of daily practice give, cannot be imparted in the school.

In mechanical engineering the same principle is illustrated. The highest department in this art is that of construction, and in this department the highest function is the designing of machinery. Now the most perfect knowledge of the theory of a machine and its mathematical relations, of the strength of materials or the economical use of power, will not suffice to qualify a man to design a machine or a system of machines, for the reason that in this work an element must be considered not at all included in theoretical knowledge—namely, the element of economy in the manufacture as well as in the operation of the machine. A machine, any part of which requires for its manufacture a tool (such, for instance, as a peculiar lathe) which is not already possessed by the manufacturer, and which, after the construction of this one part, would not be necessary or useful for other work, such a machine could not be profitably built. In other words, machines must be so designed, in a large majority of cases, as not to necessitate the construction of other machines to make them, and the planning of machinery so that it shall be at once economical and durable in operation and simple and cheap in construction is not merely an important incidental duty, it is absolutely the chief and most difficult duty of the mechanical engineer.

But if you consult, as I have done repeatedly, the men who, by long and laborious practice, have arrived at great skill and experience in any one of these professions, in spite of deficiencies in early training, you will find that they heartily lament the lack of those opportunities which the careless student is so apt to undervalue; that they spend many weary hours in the attempt to make good this lack, and that they find themselves restricted and cut short in their success for want of that mastery of general principles and of theories which would enable them to rise higher and assume wider command. It is in school that we teach the student how to study, how to investigate, how to take hold of the problems of practice as they rise. We do not solve all these problems in advance for him. It is here that we impart scientific method and the knowledge of scientific means and manipulations. Yonder in the great world of actual life every man must show for himself what stuff is in him, and wearing the armor and wielding the weapons with which he has

been furnished, he must conquer or fall according to his fortunes and his deserts.

The importance of the different branches of engineering to this country scarcely needs an argument. Skilled labor and skill in the direction of labor are still urgently called for on every side. Take for instance our mining industry. If we begin with the most important of all substances obtained by mining—namely, coal and iron—what a spectacle of intense energy and rapid development is presented by the present condition of the country! The immense area of our coal fields, from the small anthracite deposits of Rhode Island to the vast formations of lignite, that stretch from the British line along the whole flank of the Rocky Mountains far into Texas, and, still further west, the deposits of the Pacific coast, from Alaska to California, an aggregate area of more than 300,000 square miles, resound in every part with the activity of the miner; and our product of iron ore, augmented every year by a stupendous increase, is still inadequate to supply the eager demand of the furnace men and their facilities for the manufacture and the insatiable market that calls for all and more than all that we are so far able to produce. Of other metals we have no lack. The copper of Lake Superior, Tennessee, Virginia, North Carolina, has been already the source of considerable production, and these regions are far from exhausted, while in the great states and territories of the West this metal is certain to play in the future an important part, becoming in Arizona and Montana at least, as it is already to some extent in Colorado, the basis for the smelting and reduction of materials containing gold and silver. Zinc is produced abundantly in many parts of the country, and its manufacture will doubtless increase with the growth of the market. Nickel is substantially a monopoly, since the single mine in this State represents the product of the whole country. Tin is found in various places, though never thus far in large quantities or under such favorable circumstances as to permit its profitable working. With regard to lead, it may be remarked that its production in this country has recently received a fresh impetus from the discovery and development of the great deposits of argentiferous ores in the far West, so that it may be expected that the loss occasioned by the decline

of lead mining in the Mississippi Valley is more than made up from these fresh sources. To these items already enumerated I must add the great production of petroleum and salt in the East and of the precious metals in the Rocky Mountains, the Inland Basin and along the Pacific coast.

Now in the utilization of all these natural resources we are approaching every day a condition of affairs imperatively requiring the assistance of science. Our coal mines, having attained greater depths, show themselves not less dangerous from fiery or noxious gases than those of the Old World. Few problems are more difficult than those which the mining engineer encounters in fighting fire underground, and even our anthracite mines, it now begins to appear, will by no means be hereafter as free from this evil as they were in earlier years. In all other kinds of mining, moreover, the difficulty, if not the danger, is increased as operations are extended under ground. A point is reached in such an undertaking where the lack of skill and forethought in opening the mine makes itself felt in the greatly increased cost of working it; and this evil, growing continually greater, can only be remedied, if at all, by a reform in administration, while it can be prevented by the employment of proper skill at the outset. Moreover, as the mechanical difficulties of mining are increased, the necessity of machinery for drainage, ventilation and transportation becomes evident. There is, therefore, a natural demand for persons capable to plan, erect and operate such machinery. Again, the extension of underground workings necessitates careful instrumental surveys. It is no longer possible to estimate by the eye the dimensions and positions of subterranean works. Complete and accurate maps are required to enable the miner to conduct his explorations and exploitations with judgment and economy, and to furnish him a trustworthy knowledge of the condition and resources of his mine. Then, too, as operations advance, the character of the product changes. The early stages of mining in any district and in any country are usually attended with considerable recklessness and waste, the losses of which are made good by the richness of the materials mined. The most promising deposits are first attacked, of these the richest portions are exclusively worked. In short, the cream is skimmed from the mineral

wealth of the country, and it is not until this period has measurably passed away, and the lesson has been learned that a permanent industry must be based upon the utilization of that which has been considered worthless hitherto, that the era of scientific work commences. This entails the necessity of contrivances to reduce expenses in the extraction of ores; of economical methods for concentrating their bulk and thus increasing their relative value, and finally, of new processes for the complete reduction of those more complicated combinations which in the flush times of the young industry were not treated at all.

Thus, for example, in our coal mines we are studying how to diminish the waste of coal caused by a hasty and rude extraction, and to contrive such methods of mining as will not destroy those narrower and poorer seams which, for the present, are not worked, and we are attempting to make useful in one way or another vast amounts of the inevitable refuse which attends the extraction, breaking, sizing and shipment of coal.

A similar problem meets us in iron mining. The sudden expansion of our iron industry, calling for more extensive supplies of crude material, has had the immediate and natural result of a depreciation of the quality of ore furnished by the mines. Even from regions of such exceptional wealth in this respect as Lake Superior, it has been found impracticable to ship ores in the required quantity and to maintain the quality, at the same time, which formerly characterized them. Hence the ironmasters throughout the country are busy with experiments for the economical treatment of leaner or more impure ores than they formerly obtained. The great question of iron metallurgy to-day may be said to be the production of a good quality of iron from ores of a relatively inferior class.

The metallurgy of gold and silver presents a similar spectacle. It is no longer by finding nuggets or by washing rudely the auriferous earth collected in the eddies of mountain streams that the gold product of this country is obtained, but by the employment of natural forces on a grand scale, sluicing down mountains, and concentrating vast quantities of almost barren material, or by employing the affinities of other substances and extracting the precious metal by chemical combinations; and in the place

of the earlier and ruder methods of silver extraction we are adopting more perfect mechanical concentration, chemical decomposition, and the complicated reactions of the shaft, furnace, and reverberatory.

But it is not only in the production of the simple metals that this condition may be observed. In all the manufactures based upon the mineral products, the same tendency is manifest. Some one has well said that the utilization of refuse is the measure of civilization. That which the alchemists sought in vain, their descendants are finding step by step—the Philosopher's Stone, which will turn the most despised substances to gold. The illustrations of this are innumerable. I must be content with one or two.

Few forms of refuse were more troublesome to dispose of, a few years ago, than the coal-tar which accumulates in the manufacture of gas. At first, it was used only as a rude kind of paint for iron, etc. Afterward, it was distilled, and yielded a volatile oil, with which Bethel impregnated wood to preserve it from decay. Then it was found that one of the distillates was a good material for removing stains and spots from cloth. But all these applications were inadequate to dispose of the great quantities of tar that accumulated. Then came the grand discovery of aniline, enriching the world with new and brilliant colors; and now even the refuse of the aniline manufacture yields anthracene and alizarine, the artificial madder, the discovery of which is one of the most important events of the day, revolutionizing a great industry, and completely annihilating a branch of agriculture, to supply its place with a manufacture less expensive of labor, and hence in the end more beneficial to man. So now we have swarthy tars on the forecastle and radiant tars on the promenade deck. The black and ugly substance that was so long despised has taken wings of beauty and is admired of all men. It was an angel in disguise.

Another curious instance is the new manufacture of crayons from the gypsum which is left after making soda-water, and the calcareous slime constituting the refuse of the soap factory. What we call chalk and use on the blackboard is in most cases not chalk, but largely gypsum. But time would fail me to recount the numerous applications of science in the utilization of

waste material. It is, perhaps, the most promising field for making money in the present day; and after the explanations already given, you will understand that I mean to say it is a promising field for undertakings beneficial to society. And it calls loudly for workmen—not for professional inventors; that is, mere guessers and vague experimenters, but experts, who, knowing their ground, and divining truly what needs to be invented or improved, will advance with sure and safe steps.

I cannot pause to speak at length of the opportunities offered in mechanical, civil, and railway engineering and architecture. There is an army of men already employed in these professions; but it needs recruits, and the service is one in which merit finds room to rise.

In all these occupations of which I have been speaking, there is a demand for thorough, trained, practiced, skillful men. There is no royal road to success in them; but there is a sure road, that begins here, in faithful study and preparation. The moral element of this preparation is not less important than the intellectual. One of the leading engineers of the United States said to me the other day, "When I wish competent agents to superintend works for which I am responsible, my greatest difficulty is to get good men. I can find twenty who know enough for every one whom I can certainly trust." Uprightness, virtue, Christian manhood, these are sure to tell in the life-career. I cannot but deem it a peculiar advantage of Lafayette College as a place of preparation, that it is measurably removed from the excitement, distractions, and temptations of great cities; that the moral and religious influences of the place are like the skies that bend and the breezes that blow over it, pure and healthful.

Before I close, let me appeal to young men to throw away finally and for ever the notion of the superiority of the so-called learned professions in point of respectability over the calling of the mechanic or the engineer. George Fritz of Cambria, whom many of you knew, and whose recent loss you do not cease to mourn, lived as useful a life, and died as much honored and regretted by his fellow-citizens, as if he had been an orator or a statesman. What he accomplished by patient ingenuity for the art to which he devoted himself gave him as good a title to fame as that of the proudest savant. I do not say that those who feel

called by inward fitness or by outward intimations of Providence to become lawyers, physicians, or even philosophers, should not follow the call; but in the name of manhood, do not choose any one of these, still less the army, and least of all the pulpit, because you think it is "respectable!"

I must protest also against the strange delusion that carries so many young men into trade—the delusion that fortunes are more easily accumulated in this than in other lines of life. The statistics are against this assumption. By far the larger part of our merchants go into bankruptcy and have to begin anew, or change their occupation altogether. Thousands of young men are found in New York every winter almost starving for want of work, who cannot do anything but keep books or run a commission business, or sell ribbons over a counter. Trade is honorable, when honorably conducted; but it is just now overdone. We have too many middlemen between the producer and the consumer; and the young man who, without special fitness or reasonable prospects of promotion, blindly goes into mercantile life, is foolishly swelling the ranks of an overpopulated class.

But what shall I say, then, of the strange furore to go into Wall street "and operate"? The legitimate business of finance, exchange, banking, etc., is absolutely essential to industry. Far be it from me to undervalue it or its honest representatives. But the desire of getting rich suddenly by speculation—of getting money, not making money—that is, creating or producing value; of living by the wits, not the earnest labor of mind and hand—this is a temptation of Satan. And here, too, the inexorable statistics show the folly of the gambler's hopes. Thousands of so-called "country customers" go into Wall street every year with small capital which they mean to multiply. Six months is longer than the average career of these adventurers. Their little fortunes pay the expenses of the keener speculators. And even of the few who, after years of debasing practice, at last become skillful operators, how many really carry after all as much money as their trouble, anxiety, and slavery of labor has been worth? Every year there is a new king of the street, who in many cases comes to the throne like an Oriental usurper, by treacherously killing his predecessor.

These are times, my friends, that preach loudly the instability

of riches. When panic shakes the market and the exchange, and values shrink, and great houses fall to pieces, carrying down all who trusted in them, the man who is serenest and most safe is he who carries a reserve of capital in his brain and hand, and who can say, "Come what may, while I have this knowledge and skill that men require, I shall not be utterly cast down."

For the sake of your success and your manhood, young man, lay broad the foundations of education; do not be afraid of learning too much, or of preparing thoroughly for your life's career. And, whatever that career is to be, remember that you cannot safely be ignorant of the great facts of science and its applications in human industry. This knowledge will be ranked henceforward among the necessary elements of a liberal education. And if you are drawn, as I think active and healthy minds cannot fail to be, to the practice of some useful art, we hold out our hands of welcome to you, and offer you an initiation into the mysteries which you must thereafter explore alone. You will be rewarded at every step, if you advance in the scientific and humane, not the drudging and greedy spirit; and you will find yourself in the line of deserved wealth and honor. To this useful application of scientific truth, to this true Art of Making Money, we dedicate this edifice, in itself a glorious illustration of the true Art of Using Money, trusting that the purposes and labors of the Department this day transferred to it may ever deserve the applause of man and the prospering favor of Almighty God.

APPENDIX.

The following report of the general proceedings of the day is taken from the Easton DAILY FREE PRESS of October 22:

The vicinity of the college yesterday morning presented a busy scene. Some preparations were yet to be completed about the new building. At an early hour visitors began to arrive, and strange faces were seen in every part of the grounds. The students felt the importance of the occasion, and determined that the day should not lack in being honored through any want of enthusiasm on their part. At ten o'clock the college bell was rung, and according to the arrangements, the different bodies who were to take part in the procession formed in the neighborhood of the chapel. The different classes, under the direction of their marshals, occupied the portion of the road immediately north of the chapel. They were gay in the colors of their respective classes and appropriate badges, and impatiently awaited the time when the procession should move. The Synod of Philadelphia, which had left Philadelphia early in the morning in a special train, arrived about ten o'clock, and in a body marched up College Hill. The trains on the New Jersey railroads also brought large numbers of the members of the Synod of New Jersey, who at once proceeded to the centre of attraction—the grounds of the college. Many distinguished men and scholars, representatives of other institutions, were present.

The procession was at last formed under the direction of Professor Youngman, the college marshal, and headed by a band of music, moved toward the new building. It was composed as follows:

The officers of the college classes as escort.

The orator of the day with the president of the faculty.

The governor of Pennsylvania with other officials.

The present and former trustees of the college with trustees of other colleges.

Present and former members of the faculty with representatives from sister institutions.

The clergy and other specially invited guests, including the American Institute of Mining Engineers.

Alumni in order of their graduation with former students of the college who did not take their degrees.

Citizens of Easton.

Undergraduates of the college.

A dense crowd had already gathered about Pardee Hall. The different floors were thronged with crowds of visitors, and the galleries which had been thrown open to the public at ten o'clock were already completely filled, the ladies occupying a majority of the seats. When the procession reached the building, it parted right and left up the staircases on either side of the corridor, and thus entered the spacious auditorium. It was not long before the large room was densely crowded. The bands of music were stationed in the music gallery, directly over the platform, and discoursed sweet strains at different stages of the proceedings. A large platform had been erected in the front, and on this were seated President Cattell, Ex-Governor Pollock, Mr. Pardee, Governor Hartranft, a number of the trustees of the college, and distinguished visitors from abroad. Among these were President Barnard, of Columbia College; Rev. Dr. McGill, of Princeton Theological Seminary; Selden T. Scranton, of Oxford, N. J.; President Coppée, of Lehigh University; Prof. T. Sterry Hunt, of the Massachusetts Institute of Technology; Prof. Meyer, of Stevens Institute, Hoboken; Prof. Johnson, of Yale; Prof. Hillman, of Dickinson; President Muhlenberg; George Musgrave, D. D., LL.D.; Rev. J. S. Woodside, from India; Rev. Dr. Miller, moderator of the Synod of New Jersey; Rev. Dr. W. O. Johnstone; President Magill, of Swarthmore.

The exercises began with an invocation by President Cattell, who afterward introduced to the audience the orator of the day, Professor Rossiter W. Raymond, a member of the college faculty, United States Commissioner of Mining Statistics, and president of the American Institute of Mining Engineers.

At the conclusion of Professor Raymond's eloquent address, which was listened to with great interest on the part of those present and interrupted by frequent bursts of applause, Professor Barlow, in whose charge the preparations for the collation had been placed, announced that the tables had been spread in the large laboratories on the fourth and fifth floors of the building. There was room for six hundred, and that number would be admitted to the rooms in the order of the procession, while the others would be served at successive tables.

The spacious laboratories had been turned into banqueting halls, and long lines of tables groaned beneath the substantial viands provided. Beautiful bouquets of flowers adorned the rooms.

The streets of Easton had presented a busy spectacle all the morning. The different trains brought hundreds of visitors, and a con-

stant stream of people flowed toward College Hill. Bands of music paraded the streets, stopping often before the FREE PRESS office to tender the compliment of a serenade. In the afternoon business was entirely suspended. Every store was closed, the noise of the factory had ceased, quiet brooded over the workshop. The merchant had left his counter, the mechanic had doffed his apron, the lawyer had thrown aside his brief, and all united to honor the day. There has not been an occasion for years in which our citizens have joined with such universal interest.

Soon after one o'clock the different organizations, which were to take part in the parade of the afternoon, were moving through the streets of the town. All the civic societies were represented, and South Easton and Phillipsburg sent their organizations. Under the direction of the Chief Marshal, George M. Reeder, Esq., the line was formed on South Third street, the right resting on Centre Square. It moved in the following order:

Chief Marshal, George M. Reeder, with Assistant Marshals, Messrs. Joseph S. Osterstock, J. N. Thatcher, John Bacon and Adam Drinkhouse, mounted on gayly caparisoned steeds.

Platoon of police.

EASTON CORNET BAND.

Easton Grays, under command of Captain Frank Reeder.

Members of Fifty-first Pennsylvania Volunteers, under command of Captain Daniel L. Nicholas.

Bell Post, G. A. R., under command of Samuel Lesher, S. V. C.

Columbia Council, O. U. A. M., John M. Phillips, Marshal.

Excelsior Council, Jr. O. U. A. M., Howard Bitters, Marshal.

BATH CORNET BAND.

Fatherland Lodge, I. O. of O. F., Joseph Fladd, Marshal.

Peace and Plenty, Lehicton and Elon Lodges, I. O. of O. F., A. Laubach, Marshal.

Washington Camp, P. O. S. of A., G. Heller, Marshal.

Druids of Easton, H. Hoffmier, Marshal.

Knights of Pythias of Easton, J. Deichman, Marshal.

Teedyuscung Tribe, I. O. of R. M., of Phillipsburg, S. Vanorman, Marshal.

Saranac Tribe, I. O. of R. M., of Easton, T. Coyle, Marshal.

Emerald Society, M. J. Levan, Marshal.

German Mechanics, John Newbrand, Marshal.

Governor John F. Hartranft, Auditor-General Harrison Allen and Chief Burgess A. B. Howell, in a carriage drawn by four horses.

Nazareth Band.

Town Councils of Easton, South Easton and Phillipsburg,
School Board of Easton.
Easton High School.

Ringgold Band, of Reading.

Chief Engineer James Ward and assistants.
Humane Fire Company, No. 1, with carriage.
Washington Fire Company, No. 3, with steamer drawn by four horses.
Keystone Fire Company, No. 5, with steamer drawn by four horses.
Lafayette Fire Company, No. 6, with carriage.
Citizens in carriages.

The procession was the finest and most imposing that has appeared in the streets of Easton for years. It was over a mile in length, and, gay with flags and banners, was a chief feature of the outward display of the day. The governor of Pennsylvania was greeted with cheers along the route of the parade. The pupils of the High School carried a banner especially gotten up for the occasion. The splendid flag of Excelsior Council attracted attention. The Fire Department, with engines and carriages, presented, as usual, a fine appearance.

The procession moved over a short route through the streets of Easton, as had been previously announced, and then marched over the Bushkill bridge and up the road to the college grounds. At different points on the hill crowds of people were gathered to witness the approach of the procession. From some favored points a view of the whole line of marching men, with flags and ensigns and regalia, could be obtained. After the head of the line had arrived upon College Hill the procession could still be seen moving down from the foot of Third street.

Over the gate leading into the college grounds, the Lafayette Fire Company had erected an arch trimmed with evergreens and flowers. It bore in large letters, the names

LAFAYETTE—PARDEE.

Upon the bases on which it rested were the words,

JUNKIN, 1832. CATTELL, 1873.

Some verses of Scripture were inscribed on the keystone of the arch, the 17th, 18th and 19th of the sixth chapter of 1 Timothy.

All the afternoon crowds of people had been pouring up College Hill. They crowded Jenks' Hall, they filled the new building, and were scattered over the campus. The crowd around Pardee Hall was numbered by thousands. A procession had been formed at the

College Chapel of the undergraduates, the Faculty and the Trustees of the college. At its head, side by side, walked President Cattell and Mr. Pardee. It moved toward the entrance of the college grounds, where it met the procession from town, and escorted it through the college grounds. The procession moved around Pardee Hall, and halted at the front of the building. President Cattell, Mr. Pardee and the distinguished guests advanced to the elevated plateau immediately in front of the entrance, while the procession from town passed in review. An immense assemblage had now gathered about the front of the building. The balconies and windows of the edifice were filled with ladies and gentlemen, as were also those of the adjoining college buildings.

As soon as quiet was restored, the simple ceremonies of delivering over the building into the possession of the college authorities began. Mr. Pardee, in a modest address, handed over the keys to President Cattell. He said:

The completion of this building makes it my very pleasant duty, on behalf of the Building Committee, and myself as the donor, to formally present it to you, as the representative of the Trustees and Faculty of Lafayette. The building itself speaks of the skill and taste of the architect, the faithfulness of the builder, and the care with which it has been supervised during its erection. Our responsibilities have not been small; but on you, sir, and on the students who shall go out, year by year, from these halls, rests a far larger responsibility—the reputation of the institution. But, looking to the future by the light of the past, we rest the responsibility on you with no misgiving. I have the honor, sir, of now presenting you with the keys of the hall.

After the tumultuous cheering that greeted Mr. Pardee had ceased, President Cattell responded as follows:

In receiving from you the keys of the building for the scientific department of the college which you have so munificently endowed, I can find no words adequate to express my own thanks, or the thanks of my colleagues in the faculty, for this grand addition to their means of attractive and thorough teaching and of their own scientific researches, or the thanks of the trustees and patrons and friends of the college, alike interested in her welfare, or the thanks of all friends of education who see in such a large and unselfish use of wealth for the benefit of mankind the noblest use to which it can be applied. And I know you, sir, so well, that I am sure the less I say to you on an occasion so public, the better you will be pleased. I shall, therefore, only assure you that our hearts are full of gratitude for your munifi-

cent gift and for your wise and judicious counsels under which the college has grown and prospered, and that we and our children will not cease to cherish and honor your memory, and that our heartfelt prayer to the Giver of every good and perfect gift is for His richest blessings to rest ever upon you and yours.

The whole assembly, with one voice, then united in singing the Doxology, "Praise God, from whom all blessings flow." When the last echo of the grand old hymn had died away upon the air, the venerable Dr. Coleman, professor of Latin in the college, invoked the blessing of God upon the institution and the man who had so munificently endowed it.

Ex-Governor Pollock then introduced Governor Hartranft, who was greeted with loud cheers. The governor thought that this was a proud day for Easton and the college. It was a proud day for him to be present and see the keys handed over by his liberal-hearted friend Mr. Pardee to the president of the college. He had not had the pleasure of close association with the college, but from what he had seen of President Cattell, his executive ability, his energy and his enterprise, he was satisfied that the magnificent gift of Mr. Pardee had fallen in good hands. He spoke at length of the necessity of a scientific education. He advised young men not to go forward too rapidly in life, and to select their professions with care. If there were more men in active life of the character of Mr. Pardee the world would be better. The donor of the hall had unconsciously erected a monument to himself which would endure throughout time.

The next speaker was Edward H. Green, Esq., president of the borough council of Easton, who was warmly greeted. He said he was not a public speaker, and if he were, he would not detain the vast assemblage at this time with any extended remarks. He would simply say that, on behalf of the citizens of Easton, he would congratulate the college on the princely gift they had received that day from Mr. Pardee.

He was followed by Major A. B. Howell, chief burgess of Easton. He said that to him this was a double pleasure. He felt a profound interest in the occasion, both as a graduate of the institution and as a citizen of Easton. He rejoiced that the college had been founded in our midst, not simply on account of the material advantages, but for the educational, literary, and religious influences that flowed from her. The college held out before all men the maxim, "The fear of the Lord is the beginning of wisdom." We dedicate this building to-day. We hope that these halls may send forth men who, by their

living and dying, may prove that this trust was committed to a worthy charge. (Great applause.)

Mr. Edward F. Stewart, president of the Easton board of control, next appeared before the audience. He stood here as a representative of the college, being an early graduate. But he represented more directly the public school system. It had been said that there was a connection between the public school system and the college. He thought that this was so. It was thought that education was only fit for professional men. In a country like this it was especially essential that every man should at least have the elements of an education. A great republic could only be sustained by the intelligence of its people. The workman might not be better qualified to drive the plow or wield the hammer, but he would represent manhood. (Continued cheering.)

A short and stirring address followed from Ex-Governor Pollock, who said that he was never so inspired before to battle in the cause of education as he had been to-day.

The addresses in the open air were then brought to a close with the announcement that they would be resumed in the lecture hall of the building. The procession was then re-formed and took up the line of march for the town again. The auditorium was found to be already occupied, and but a tithe of the multitude could gain access. It was with difficulty that the speakers and specially invited guests could reach the platform.

Prof. J. P. Wickersham, LL.D., superintendent of public instruction in Pennsylvania, was the first speaker.

He came here to show the sympathy of the public school system of Pennsylvania with the good work that was being done in Lafayette College. The building that they dedicated to-day was a proud monument to its founder. It was a monument that would outlast the royal families of Egypt. They builded pyramids that would crumble to the dust, but this monument would reach to the skies, ay, even beyond the skies. Personally, too, he was proud that this building had been erected here. Fifteen years ago he had ascended the hill and viewed Lafayette College. To-day he felt that there had been a wondrous change, and all honor should be ascribed to the man who had been at the head of the institution for the last ten years. At Lafayette a reconciliation had been effected between colleges and the public school system of instruction. He formerly had to complain that the college men of Pennsylvania had stood aloof from common schools. But he found the president and professors of Lafayette mingling with the common school teachers and taking them by the

hand, visiting State associations, and taking part in teachers' institutes. It was one reason why the institution had recently experienced such wonderful prosperity.

Several speakers followed each other in short, enthusiastic addresses, and the exercises were kept up until the evening shadows darkened the room. Among the speakers were the Rev. Dr. John Harris Jones, president of Trevica College, South Wales, and Rev. Dr. Robert Knox, of Belfast, Ireland, delegates to the Evangelical Alliance recently held in New York. Dr. Knox referred to the fact that a former student of Lafayette, Rev. Robert Watts, D. D., was a distinguished professor of theology in an Ireland college. Hon. B. G. Northrup, secretary of the Connecticut Board of Education, expressed the conviction that such courses of technical study as were afforded at Lafayette, with all the apparatus and other appliances offered by the noble building in which they were met, would soon do away with the necessity of our young men going abroad for technical education. He also expressed his delight at the cordial and enthusiastic feeling exhibited by the citizens of Easton toward the college. It was a rare sight, the silent and deserted town beneath them, all business suspended, and the whole populace poured forth to greet the college on this glad day! Gownsmen and townsmen rejoiced together! Hon. Heister Clymer, of Reading, Pa., made a brief but eloquent address. Rev. Dr. Charles H. Robinson, of New York, spoke in his usual felicitous manner. Dr. N. J. Woeikof, secretary of the Meteorological Committee of the Imperial Geographical Society of Russia, who had come to the college to visit the lamented Dr. Coffin, gave his tribute to the extended learning and great usefulness of Lafayette's deceased professor of mathematics and astronomy.

In introducing Ashbel Welch, of New Jersey, the distinguished civil engineer, and member of the board of examiners for the Pardee scientific department (who made a short but excellent address), President Cattell gave a brief historical sketch. He said that one day, about forty years ago, a young lad was plowing in his father's fields in Rensselaer county, in New York, when he received a letter. He opened it, and found the offer of a position as rodman, down in New Jersey, with Mr. Welch. He left home to take it the very next day, bringing with him the fortunes of Lafayette! He (Ario Pardee) came to this valley about the time the college was started. The speaker told of the unostentatious way in which the first gift of $20,000 was put in his hands in 1864, which was followed by still larger sums, from time to time, as successive additions were made to the Scientific Department, until the amount given by Mr. Pardee was

nearly half a million. He also spoke of his valuable service as a trustee, in which capacity he had shown great delicacy in always refraining from giving any sign of the great indebtedness of the institution to him. He closed with the remark that his heart was too full to speak of the respect and love he felt for him.

Rev. E. Ferrier, president of the alumni society, was called upon to respond for the alumni of Lafayette, and President Gilman, of the University of California, for the educational institutions of the Pacific coast, but the audience did not have the pleasure of listening to these gentlemen, as the lateness of the hour had compelled them to leave. President Gilman left a note for Dr. Cattell, in which he said:

". . . Let me give you in script the congratulations which the crowd prevented me from giving by mouth. Never saw I such an amount of popular interest in a college; never so much sound theology in applause at so much sound science as Dr. Raymond uttered. Verily it seemed, when you brought together a Westminster Synod and an Institute of Mining Engineers, as if righteousness and truth had kissed each other!"

To a toast to the American Institute of Mining Engineers, David Thomas, of Catasauqua, its first President and the Nestor of practical science in the Lehigh Valley, was called upon to respond. He had been compelled to leave the room before this stage of the exercises was reached, and the audience, by a unanimous and enthusiastic vote, expressed their wish that Mr. Thomas would print the remarks he would have made had he been present.

Among numerous letters and telegrams, some from distinguished men and celebrated scholars, regretting their inability to be present, and others from sister colleges sending their greetings, a letter was read from Prof. Henry, of the Smithsonian Institution, in which the great loss to the world by the death of the late Professor Coffin was alluded to in touching terms.

The long metre doxology was sung, and at dusk the exercises were closed with the benediction by Rev. Dr. Hunt.

College Hill was gayer last night than it has ever been before. The buildings were brilliantly illuminated. Lights flashed across the campus, and the brilliant rays from lamps, stationed here and there, made the winding path up the hill a pleasant walk. Pardee Hall, with its numerous windows, presented a brilliant appearance. The auditorium, and, indeed, the whole building, was filled by a throng of ladies and gentlemen, who were there to offer their congratulations to Mr. Pardee and President Cattell. The brilliant uniforms of the Easton Greys added much to the poetry of the occasion. The Easton

Band and the Ringgold Band, of Reading, were stationed, one on the platform and the other in the music gallery of the auditorium, and discoursed enlivening strains throughout the evening. The assemblage was graced by the presence of a large number of eminent individuals and learned scholars. The time was spent in conversation and informal congratulation. It was not until a late hour that the audience began to disperse, every one well pleased with the events of the day.

A torch-light procession of the fire department, accompanied by bands of music, marching through the streets of Easton, and visiting the college grounds, where Mr. Pardee, appearing in front of the hall, made one of his brief speeches, thanking them for their courtesy, closed the exercises of the day.

The following also appeared in the FREE PRESS, containing some of the letters referred to in the foregoing report:

From Samuel D. Gross, M. D., LL. D., Professor in the Jefferson Medical College, Phila. (formerly Professor at Lafayette):

PHILADELPHIA, Oct. 17, 1873.

PRESIDENT CATTELL, *Reverend and Dear Sir:* I have the honor to acknowledge, through the kindness of my friend Professor Green, the receipt of your letter inviting me to be present at the dedication of Pardee Hall. It is a source of deep regret to me that, in consequence of my official duties, it will not be in my power to be with you on so interesting an occasion, to do honor to your institution, and especially to the gentleman who has so munificently endowed it. Having been early associated with Lafayette College, at the time when it was struggling for an existence under the guardianship of the good and noble-hearted Dr. Junkin, I have never ceased to feel an interest in its prosperity; and now that it is rearing its head aloft among the sister colleges of the country, I feel not a little pride in the success which it has achieved under its different administrations. To none of its Presidents is the college so much indebted for this result as to yourself, and I trust in God that you may long be spared to direct and guide its destinies. With the aid of your distinguished colleagues, embracing some of the best minds in the country, and of the munificent liberality of Mr. Pardee and others, the permanency of Lafayette College is no longer a matter of doubt or cavil; nor is it difficult to foresee the influence which the institution is destined to exert upon the literary taste, the scholarship and the scientific attainment of the young men of the United States, and through them upon the country at large.

Thanking you most cordially for your invitation, I have the honor to be,

Very truly, etc., your friend and obedient servant,

S. D. GROSS.

From Rev. James C. Moffat, D.D., Professor in the Theological Seminary, Princeton, N. J. (formerly Professor at Lafayette):

EASTON, Oct. 21, 1873.

REV. W. C. CATTELL, *My Dear Sir:* Through the Rev. Dr. McGill and myself, who are both here present, the Faculty of the Theological Seminary of Princeton present their greeting to yourself and the Faculty of Lafayette College, on the momentous occasion of opening Pardee Hall. We cordially congratulate you upon an event so auspicious to the college with which it is connected, and to the cause of education.

As for myself, I should probably have been here on my own account, as usual on your special occasions; but on this, I am sent. "You will appear there," said Dr. Hodge to me, "as one of their old professors, but we want you now to represent us, and carry to Lafayette College the salutations of Princeton."

I think this may be looked on as the hand of theology fraternally extended to science. We hail as a fellow-worker every true and earnest laborer in the mines of truth. Theology has its relations to every other branch of human knowledge.

With admiration for the gratifying success of Lafayette College under your administration, and most hearty wishes that, with the blessing of God, it may long continue, I remain, yours very truly,

JAMES C. MOFFAT.

From the College at Princeton, letters were also received from President McCosh and several of the professors, all sending their congratulations, and regretting their inability to be present. We print the letter from Dr. Atwater, one of the foremost metaphysicians of the age, and whose visit to Lafayette last summer is still remembered with peculiar pleasure by all who had the pleasure of meeting and hearing him:

COLLEGE OF NEW JERSEY, Oct. 12, 1873.

REV. DR. CATTELL, *My Dear Sir:* It is a matter of extreme regret that I find myself prevented, by engagements which I cannot escape nor shift to any other day, from attending the dedication of Pardee Hall, to which you have done me the honor to invite me. I may nevertheless avail myself of the opportunity which this note affords, to congratulate you on this further great advance in the progress of the college under your administration, the trustees, faculty and friends of the institution, on the high rank it is so rapidly taking among our seats of learning; and above all, your noble benefactor, Mr. Pardee, that it has pleased God, not only to give him the wealth requisite for rearing so grand a structure, but what is still more precious, the heart to use it for such worthy ends. All honor to him and such as he. Be assured, my dear sir, that the pleasure of giving this expression to my feelings, is only less than I should experience could I be present to express them in person.

Very truly yours,

LYMAN H. ATWATER.

Of the Pennsylvania colleges, Lehigh University was represented by President Coppée, Muhlenburg College by President Muhlenburg, and Swarthmore College by President Magill. The others sent their greetings by letter or telegram.

President Woods, of the Western University, of Pittsburg, writes:

". . . The occasion will be one of interest not only to you, but to every lover of learning in the State. Your success is the success of education; your elevation will tend to elevate all higher institutions; generosity to you will awaken generosity to other colleges. We rejoice that so noble a building is to be transferred to you."

President Loomis, of the University at Lewisburg:

". . . We rejoice with you. We appreciate the service which, with the new means now at your disposal, you will be able to render to science and to the young men who will be gathered into your institution. They have already received advantages of a high order. They will be hereafter such as are not likely to be surpassed by any other institution in the country.

"We appreciate, too, the munificence of the man from whom the princely donation comes. The men of wealth among us have not been tardy in responding to calls upon their liberality in behalf of eleemosynary institutions, but they have not in all cases chosen wisely the objects of their favor. We desire to express our high sense of the wisdom of the selection which has in this case been made, and with it the hope that his example may stimulate others of similar means to extend their benefactions to similar educational needs."

The following telegram from President Hays, of Washington and Jefferson College, was read amid great applause:

WASHINGTON, PA., Oct. 21, 1873.—Washington and Jefferson College tenders her kindest congratulations to her sister college on this, the day of our common rejoicing, and prays, as you lay a cap-stone and we a corner-stone, God's blessing may be upon us, both, in our work for our commonwealth and the world.

Congratulatory letters, with expressions of regret at not having been able to attend, were received from Provost Stillé, of the University of Pennsylvania; President Loomis, of Allegheny College; President Colder, of the Agricultural College; President Gummere, of Haverford College; President Valentine, of Gettysburg College; President McCauley, Dickinson College; President Jeffers, Westminster; President Nevin, Franklin and Marshall; and President Higbee, Mercersburg.

Numerous letters were also received from the presidents of colleges in other States. Chancellor Crosby, of the University of the City of New York, sent in his letter the following sentiment, which was received with prolonged cheering:

"Mr. PARDEE: He who establishes an institution of education builds a fortress for the preservation of the country's liberties."

President Smith, of Dartmouth College, writes:

". . . I cannot forbear to congratulate you on the evident favor of Divine Providence to Lafayette College, and on the liberality under that Providence, of such noble men as Mr. Pardee. He may well say,

"*Exegi monumentum ære perennius.*"

"I would there were many more such friends of Christian education. They touch not—like some noisy philanthropists—the mere surface of things, but the deep foundations. They build for many generations, and many generations shall rise up and call them blessed. I would go a weary journey to take the hand of Mr. Pardee, and tell him how men, afar as well as near, appreciate his well-considered munificence."

President White, of Cornell University:

". . . As we are in the midst of our first term and under much pressure of university duties, it is exceedingly doubtful whether any of us can be present with you on that occasion. But we send none the less our hearty congratulations to you, and join in the thanks which will be earnestly expressed on that day to Mr. Pardee for his munificent gift, which is a benefit not merely to your institution, but to the whole country."

President Chadbourne, of Williams College:

". . . We avail ourselves of the occasion to express our gratification at the great success of Lafayette College in the good work of sound education, and especially to congratulate you on this munificent donation, so valuable to you in your work, so honorable to the liberal giver."

President Stearns, of Amherst College:

". . . Pardee Hall, with its uses, as appointed, is certainly a grand gift and addition to your college. I rejoice with you, and congratulate the donor on his possessing that nobleness of heart which has induced the munificence. Men of means are not always men of generous ways. But when we find men of this character, we may thank God not only for their gifts, but still more for the manhood which induces the gifts."

President Fairchild, of Oberlin College:

". . . We are glad to add our congratulations to those of many others upon this evidence of your enlargement and prosperity. May PARDEE HALL long stand an honor to its founder and to Lafayette College and a blessing to many generations."

Similar congratulations and expressions of fraternal feeling and good-will were received from President Porter, of Yale; President Eliot, of Harvard; President Angell, of Michigan University; the Faculty of Washington and Lee College, Virginia; President Cummings, of Wesleyan University; President Brown, of Hamilton; President Hodge, of Madison University; President Robinson, of Brown University; President Purnell, of Delaware College; President Potter, of Union College; Chancellor Winchell, of the Syracuse University, and others.

RESOLUTIONS.

Resolutions of the Borough Council of Easton, Passed Oct. 3, 1873.

Resolved, That Council accept the invitation of the authorities of Lafayette College to attend the exercises connected with the opening and dedication of Pardee Hall, and will gladly avail themselves of the opportunity to testify their appreciation of the great value of Lafayette College to the country at large, and especially to this town and neighborhood; and also to give some expression of their gratitude to Mr. Pardee, through whose munificence the Scientific Department has been endowed and this noble building erected for its use.

Resolved, That our citizens be recommended to close their places of business in the afternoon of the day of the ceremonies, to join in a procession to receive Mr. Pardee, the Trustees of the College, and other distinguished visitors, and to attend the exercises upon College Hill, at the opening of the new Hall.

Resolved, That a committee be appointed in connection with a committee of our citizens to confer with Mr. Pardee to ascertain whether it will be agreeable to him on the evening of October 21st, to receive the citizens of Easton, who desire on that occasion to call upon him and testify their respect for him and their appreciation of the noble gifts made by him to the College, which have secured the permanence, usefulness and efficiency for all time to come of an institution which gives such certain promise of blessing to our whole country, by affording to our young men of all classes the opportunity of securing at a moderate expense a most thorough, practical education, qualifying them to fill with honor and usefulness the various positions in life they may be called upon to occupy.

Resolutions of the School-Board of Easton, Passed Oct. 3, 1873.

Resolved, That this Board, appreciating the eminence Lafayette College has attained among the highest institutions of the country, and believing that the occasion, in which it is asked to participate, should be made worthy of the munificent gift of Mr. Pardee, as well as promotive of the further reputation and influence of the college and of all our educational institutions, hereby accept the invitation proposed.

Resolved, That as the Board of Control, representing the school interests of the borough and recognizing the intimate relations existing between all departments of popular education, we take pleasure and pride in the marked growth of the college, and especially in the enlarged and multiplied facilities for the prosecution of a technical or scientific course, thus inviting and offering a more efficient preparation to young men for the varied industrial pursuits of life..

Resolved, That in its Faculty of twenty-eight Professors and Tutors, its enlarged classes, its flattering prosperity and its widening fame, we see an augury of still

greater progress in the future, plainly indicating that it will soon be one of the first American institutions, embracing in its wide range of instruction every qualification for professional practical life and every resource for private culture or public usefulness.

Resolved, That we regard the Pardee Hall a grand memorial of wise and unselfish beneficence, claiming our public and recorded thanks to the generous donor for so liberal an expenditure in so vital and general an interest.

Resolved, That on the afternoon of Tuesday, October 21, the public schools be closed, and the teachers of the same, with the pupils of the High School, meet at 1 o'clock at this office, to join the Board of Control in the general procession.

Resolutions of the Synod of Philadelphia, Passed Oct. 19, 1873.

Resolved, 1st. That we have heard with admiration and grateful interest, of the signal munificence of Ario Pardee, Esq., in the erection and furnishing of a building for the Scientific Department of Lafayette College, so magnificent in its proportions, so complete in its appointments, and so admirably fitted for the use of one of the most important institutions in our land.

2d. That as Representatives of the Church we offer to Mr. Pardee our heartfelt thanks for this and all his previous benefactions for the College: and we pray that the blessing of Him who "loveth a cheerful giver" may be richly manifested in all his experience.

3d. That we rejoice in this new evidence of the prosperity of that Institution which has been planted in the interests of our beloved Church, and the benign influence of which is being more and more widely felt throughout the Christian world.

4th. That we congratulate our Brother, President Cattell, on the marked success which has crowned his self-denying and courageous efforts for the enlargement and permanent endowment of this Institution, and that we extend to him and his able colleagues in the faculty, the assurance of our best wishes and prayers for their long life and prosperity in the good work in which they are engaged.

5th. That we accept the invitation to attend the dedication of Pardee Hall, on Tuesday next: and that our special thanks are due to the North Pennsylvania and Lehigh Valley Railroad Companies, for the facilities they have extended.